

## STUDIES IN AUSTRALIAN EMBIOPTERA.

## PART IV: SUPPLEMENTARY TAXONOMIC NOTES.

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(8 Text-figures and 1 Map.)

[Read 27th March, 1940.]

## Genus METOLIGOTOMA Davis 1936.

PROC. LINN. SOC. N.S.W., lxi, 5-6, p. 248. Genotype, *Metoligotoma reducta* Davis 1936, l.c.—Re-defined, Davis, 1938, *ibid.*, lxiii, 3-4, p. 227.

## METOLIGOTOMA RILEYI, n. sp. Figs. 1-3.

♂. Length 17 mm.; head 3.5 mm. × 2.7 mm. General colour (dry) dark chocolate-brown. Head (Fig. 1) with small eyes, sides of head behind eyes slightly sinuous, converging posteriorly. Antennae incomplete. Mandibles as in other species of *Metoligotoma*. Wingless. First segment of hind tarsi with a terminal ventral bladder; medial ventral bladder not apparent. If this bladder is uniformly absent, the species is exceptional in the genus; it is unsafe to generalize on a single dried specimen. Terminalia (Figs. 2-3) agreeing in general structure with other members of the genus; posterior process of right hemitergite (10RP<sub>1</sub>) curved outward, slightly dilated terminally; dorsal process (10RP<sub>2</sub>) with free edge evenly rounded, process directed upward in the type. Left hemitergite (10L) small; process (10LP) long, rather broad, expanded terminally, obliquely truncate, the oblique face directed backward and to the left, somewhat roughened. Left cercus (LC) one-segmented (i.e. the two larval segments fused); composite structure slender, incurved, obtuse terminally; cross-section approximately uniform throughout. Inner margin of LC smooth except for traces of a few subterminal nodules. Hypandrium (H) and its process (HP) normal for the genus; left cercus-basipodite (LCB) obtuse, irregularly tapered, sclerotized only terminally and subterminally on outer side. Setae of left cercus long and numerous.

♀ unknown.

*Locality*.—Townsville, Q., -/8/1903, F. P. Dodd. Holotype ♂ in the British Museum of Natural History. Named after Mr. N. Riley, Keeper, Entomology Department, British Museum.

This record extends the range of *Metoligotoma* a considerable distance to the north, and forms an interesting link with *Burmitembia venosa* Cockerell 1919 (Burmese Amber, ? Miocene), of which the genus *Metoligotoma* may be a direct descendant. The terminalia of *M. rileyi* agree more closely with *B. venosa* than do any of the more southern species of *Metoligotoma*.

The species may be fitted into the key to the genus (Davis, 1938, p. 250) at the commencement (before *M. anomala*), being separable from all other known species on the form of the left cercus and process of the left hemitergite.

## METOLIGOTOMA REDUCTA Davis 1936.

This species (re-defined, Davis, 1938; figs. 1-4) has been recorded (i.e.) from the Central Coast of New South Wales (Otford to Broken Bay, and inland). In this region, it is specifically distinct from *M. illawarrae*; at the previous most northerly record (north of Broken Bay) it occurs in the field beside *M. illawarrae* without any trace of intergradation.



Map 1.—Distribution of subspecies of *Oligotoma gurneyi* Frogg.: *O. gurneyi gurneyi*, 1-1 (to south and east); *O. gurneyi centralis*, 2-2 (to south); *O. gurneyi spinulosa*, 3-3 (to west); *O. gurneyi subclavata*, 4-4 (to north).

Each dot represents a record. Dots enclosed in more than one range represent intermediates between respective subspecies.

It is uncertain on the present data whether the range of *O. gurneyi subclavata* should be closed at the Gulf of Carpentaria, or carried further east to include the record from Chinchilla, Q., as an intermediate between it and *O. gurneyi gurneyi*. Further collecting in North-East Australia should decide this point. The two alternative ranges are shown as dotted lines, each extending to '4?'.

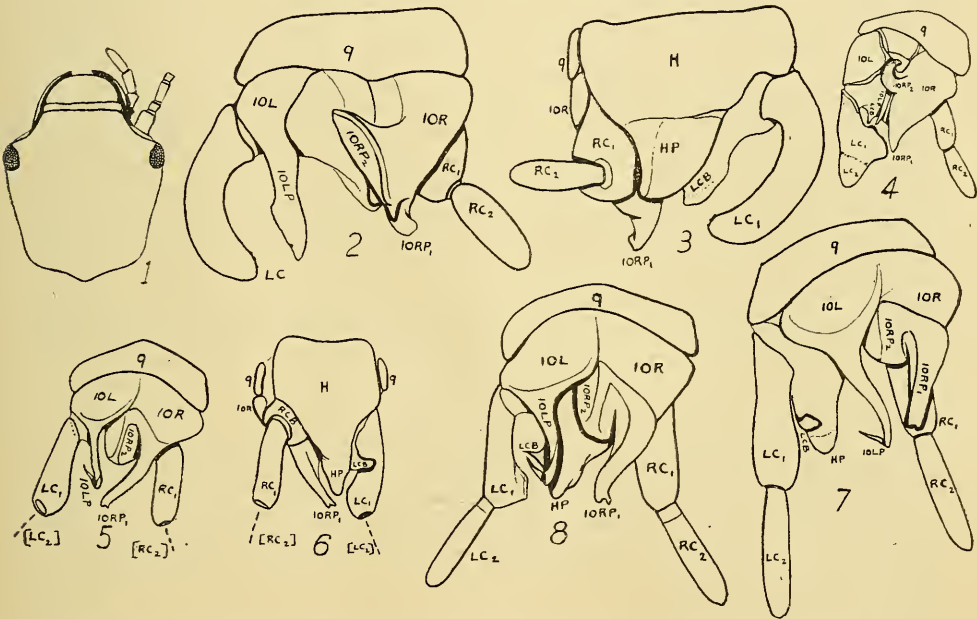
Recent records of males from the North Coast of New South Wales (Crescent Head, nr. Kempsey, 13/8/39; Mingaletta, nr. Kempsey, 15/8/39; Port Macquarie, 15/8/39) suggest that a northern race of *M. reducta* occupies this region. These series agree in size and colour with *M. reducta*, the terminalia agreeing in the general structure of the hemitergites and hypandrium, and their processes. However, both the left cercus and the left cercus-basipodite suggest an approach to *M. illawarrae*, the former in having the distal part of the inner face much less smooth in outline than in *M. reducta*, the latter being more acute, although not truly spinescent as in *M. illawarrae*. The three series differ slightly among themselves, as do the individuals of the longest series (Crescent Head) *inter se*, suggesting an unstable population.

It seems desirable to refrain from naming this northern race until more locality records, especially intermediate ones, are available. The facts suggest an unusual form of 'Rassenkreis', a common population (North Coast of New South Wales) possibly diverging gradually so as to appear as two distinct species in the south (Broken Bay and southwards). Normally, a 'Rassenkreis' comprises a circle of races, the species having spread in two directions, and, later, the extreme ranges having come into contact by closing of the circle; at this point of meeting,

isolation has rendered the populations specifically distinct in their behaviour, though they are linked, around the full circle, by a free-breeding chain of populations. Here, however, the two lines of migration (from the North Coast southwards) would seem to be coincident, culminating in populations just as distinct. Investigation of the populations north of Broken Bay (e.g. near Newcastle) should give interesting results.

Males from Crescent Head, Mingaletta, and Port Macquarie have been deposited in the Macleay Museum.

A series of males from Leichhardt, Sydney (coll. F. Hasemer) seems to agree with these North Coast forms; this population was probably introduced to Leichhardt with a stag's-horn fern (*Platyserium*), in and near which the specimens were collected at Leichhardt. The exact origin of this series is therefore doubtful.



Figs. 1-3.—*Metoligotoma rileyi*, n. sp., holotype ♂. 1. Head from above, × 8. 2. Terminalia from above, × 20. 3. Terminalia from below, × 20.

Fig. 4.—*Notoligotoma hardyi* (Fried.), ♂ from Midland, W.A. Terminalia from above, × 20.

Figs. 5-6.—*Oligotoma gurneyi* Frogg., ♂ from Lalla Rookh, N. W. Australia. (Intermediate between subspecies *subclavata* Davis and *spinulosa* Davis.) 5. Terminalia from above, × 20. 6. Terminalia from below, × 20, left cercus-basipodite bent outwards.

Fig. 7.—*Oligotoma gurneyi* Frogg., ♂ from Hermannsburg, Central Australia, with similar characters to ♂ from N. W. Australia. Terminalia from above, × 20, somewhat distorted.

Fig. 8.—*Oligotoma gurneyi spinulosa* Davis, ♂ from Geraldton, W.A. Terminalia from above, × 30.

All setae omitted; all figures based on camera-lucida outlines.

9, ninth abdominal tergite; 10L, 10R, left and right hemitergites of tenth abdominal segment; 10LP, process of 10L; 10RP<sub>1</sub>, 10RP<sub>2</sub>, outer (or posterior) and inner processes of 10R; LC<sub>1</sub>, LC<sub>2</sub>, RC<sub>1</sub>, RC<sub>2</sub>, first and second segments of left and right cerci; LC, one-segmented left cercus; LCB, left cercus-basipodite; H, hypandrium; HP, process of H.

## Genus NOTOLIGOTOMA Davis 1936.

PROC. LINN. SOC. N.S.W., lxi, 5-6, p. 244. Genotype, *Oligotoma hardyi* Friederichs 1914, *Rec. W. Aust. Mus.*, vol. 1, pt. 3, p. 241.

## NOTOLIGOTOMA NITENS Davis 1936.

PROC. LINN. SOC. N.S.W., 1936, lxi, 5-6, p. 246, figs. 9, 16, 23, 30, 37, 39-41.

In the Museum of Comparative Zoology, Harvard University, is a series of females and immature specimens labelled: 'Oligotoma gurneyi Frogg.; Sydney, N.S.W., T. Steel, iii.05.' They are certainly from the series noted by Froggatt (1905) as occurring in great numbers at Pymont (Colonial Sugar Refining Co.'s building; Mr. Steel, then an officer of that company, collected Froggatt's material). This series was referred by Froggatt (l.c.) to *O. gurneyi*, and by Friederichs (1923, p. 1) to *O. agilis* Frogg. (a synonym of *O. gurneyi gurneyi*; v. Davis, 1938, p. 252 et seq.); this course was allowed (Davis, 1938, p. 254), though previously (1936, p. 237), the different—and correct—course was suggested.

The specimens prove to belong to a genus other than *Oligotoma*, having two well-developed hind metatarsal bladders. On this character, they would be referable to *Notoligotoma nitens* or to one of the Sydney species of *Metoligotoma* (*M. reducta*, *M. illawarrae*). The reference to *N. nitens* seems reasonably certain, as the females agree in the colour and form of thoracic nota. Three penultimate instar males were preserved; although none have wing-buds (which would prove immediately that they belonged, not to *Metoligotoma*, but to *Notoligotoma*), the terminalia, with their incipient changes, are characteristic of this stage of *Notoligotoma*.

The record seems to represent a case of an indigenous species reaching great abundance under artificial conditions set up by man (high humidity and temperature from steam-outlets; abundant food in the form of raw sugar).

## NOTOLIGOTOMA HARDYI (Fried.). Fig. 4.

The following records of mature males of this species represent new localities: Midland, near Perth, W.A., vi.1936 and vii.1938 (Western Australian Museum); Rockhampton, Q., vii.1937, viii.1937 and vi.1938, coll. W. J. S. Sloan.

The terminalia of a specimen from Midland, W.A., very close to the type locality, are here figured (Fig. 4); the earlier figure (Davis, 1936, fig. 8) is unsatisfactory, as it omits the sclerite basally separating the hemitergites of the tenth abdominal segment.

## Genus OLIGOTOMA Westwood 1837.

*Trans. Linn. Soc. London*, xvii, p. 373. Genotype, *Oligotoma saundersii* Westwood 1837, l.c.

## OLIGOTOMA GURNEYI Froggatt 1904.

PROC. LINN. SOC. N.S.W., xxix, p. 672.

The following intermediates between subspecies have already been recorded:

*O. gurneyi gurneyi* Frogg.—*O. gurneyi centralis* Davis 1936 (Proc. LINN. SOC. N.S.W., lxi, 5-6, p. 237): Left cercus-basipodite of *centralis*, remainder as in *gurneyi*: Lucindale; Adelaide (S.A.); Lady Julia Percy Isd., Vic. (forma aptera) (Davis, 1936, p. 239; 1938, p. 254).—Outer process of right hemitergite of *centralis* or *subclavata* Davis 1936, remainder as in *gurneyi*: Chinchilla, Q. (Davis, 1938, p. 254).

The following additional intermediates are recorded:

(1). ♂ from Forest Reefs, N.S.W. (Museum of Comparative Zoology), almost typical of *O. gurneyi gurneyi* (the nearest known locality of which is Nyngan, N.S.W.), but with the termination of the outer process of the right hemitergite showing a slight tendency to the bidentate form seen in the Chinchilla specimens.

(2). ♂ from Lalla Rookh Station, North-West Australia (Western Australian Museum; Figs. 5-6), is suggestive of *O. gurneyi spinulosa* Davis 1936, the subspecies occupying the more southerly parts of Western Australia (infra); it differs markedly in the left cercus and cercus-basipodite. The first segment of the left cercus (LC<sub>1</sub>) is only very slightly clavate, as in the North Australian *O. gurneyi subclavata*; the present specimen has this segment less clavate even than in *O. gurneyi subclavata*, whereas in *O. gurneyi spinulosa* it is produced inward subterminally more markedly than in any other subspecies. The left cercus basipodite (LCB) is blunt, in contrast to the spinescent structure of *O. gurneyi spinulosa*; it agrees with *O. gurneyi subclavata*, or perhaps more closely with *O. gurneyi centralis*.

This specimen may represent a distinct subspecies, but it may temporarily be regarded as an intermediate; the difference is merely a matter of degree. In size it agrees rather with *O. gurneyi centralis* and *O. gurneyi spinulosa* than with *O. gurneyi subclavata* (length, in alcohol, 11 mm.; head 1.9 mm. × 1.4 mm.; forewing 8 mm. × 2.2 mm.; hindwing 7 mm. × 2.2 mm.). The general colour (pale reddish-brown) is paler than in *O. gurneyi spinulosa*, but the specimen is apparently incompletely melanized and sclerotized after ecdysis.

(3). ♂ from Hermannsburg, Central Australia (coll. H. J. Hillier; British Museum of Natural History): Agrees almost exactly with (2); the terminalia (Fig. 7) had been somewhat distorted on a slide mount, which probably explains the less clavate appearance of the first segment of the left cercus. The dimensions are: length 10 mm.; length of head 1.5 mm.; length of forewing 8 mm. The left cercus-basipodite is closer to *O. gurneyi centralis* than in the Lalla Rookh specimen.

Hermannsburg represents a focal point to the ranges of *O. gurneyi centralis*, *O. gurneyi subclavata* and *O. gurneyi spinulosa*; this supports the present classification of (2) and (3), and the consideration of these three units as subspecies.

(4). ♂ from Geraldton, W.A. (British Museum): This is an almost typical example of *O. gurneyi spinulosa*, extending the range of this subspecies from the Lake Violet-Morgan's region to the West Coast. The terminalia (Fig. 8) show only the slightest differences (in the left cercus and outer process of the right hemitergite) from typical examples (Davis, 1936, fig. 3). The dimensions are: length (relaxed) 11 mm.; head 1.8 mm. × 1.4 mm.; forewing 7 mm. × 1.6 mm.; hindwing 6 mm. × 1.7 mm. The colour agrees with the type series.

Note.—The further records have tended to confirm the subspecific (racial) status, as against specific, for *Oligotoma gurneyi* (*gurneyi*, *centralis*, *spinulosa* and *subclavata*). The distribution of the four races is indicated in Map 1. Each dot represents a record; the dots enclosed in two or more distribution-lines represent intermediates. The greatest hiatus for records occurs in North-East Australia; the range of *O. gurneyi subclavata* has been provisionally sketched to include this area, so as to make the Chinchilla, Q., record an intermediate between *gurneyi* and *subclavata*. On the present data, this record might just as well represent *gurneyi* × *centralis*. Actually, it is predicted that an undiscovered subspecies, tending towards *O. albertisi* Nav., may occupy North-East Australia; this New Guinea species has the outer process of the right hemitergite and the

left cercus-basipodite in agreement with the Chinchilla specimens, and the left cercus as in *O. gurneyi subclavata*, but it differs from them and all subspecies of *O. gurneyi* in the lack of the terminal hook on the process of the left hemitergite.

The differences between the subspecies of *O. gurneyi* are far more striking than many of the so-called specific differences between the Asiatic 'species'. In view of the above data, it seems likely that many of the Asiatic 'species' have been classed in too high a category.

OLIGOTOMA SAUNDERSII Westwood 1837.

Syn. *O. latreillii* (Ramb.); v. Davis, 1939.

New Australian records for this species, based on mature males, are as follows: Mt. Larcum, Q., x.35 and 10.viii.36; Thangool, Q., 11.ii.36, coll. W. J. S. Sloan.

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CORRIGENDUM.

Davis, 1938 (Part iii of this series): Page 271, line 7, *for levator read flexor*

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